CLAIMS

1. A sputtering target comprising a substrate and a target material formed on the substrate, wherein the target material comprises a metal oxide of the chemical formula MO_x as the main component, wherein MO_x is a metal oxide which is deficient in oxygen as compared with the stoichiometric composition, and M is at least one metal selected from the group consisting of Ti, Nb, Ta, Mo, W, Zr and Hf.

2. The sputtering target according to Claim 1, wherein in said MO_x, M is Nb and/or Ta, and x is within a range of $2<x<2.5$.

3. The sputtering target according to Claim 1, wherein in said MO_x, M is Mo and/or W, and x is within a range from $2<x<3$.

4. The sputtering target according to Claim 1, wherein in said MO_x, M is at least one metal selected form the group consisting of Ti, Zr and Hf, and x is within a range of $1<x<2$.

5. The sputtering target according to any one of Claims 1 to 4, wherein the target material has a resistivity of at most 10Ω cm at room temperature.

6. A process for producing a sputtering target, which comprises forming an undercoat made of a metal or alloy on a substrate, and forming a ceramic layer as a target material on the undercoat, wherein the ceramic layer as a target material is formed by plasma spraying wherein a

ceramic powder which is made in a semi-molten state in a high temperature plasma gas in a reducing atmosphere, is transported and deposited onto the undercoat by the plasma gas, and, as the target material, a target material comprising a metal oxide of the chemical formula MO_x as the main component, is used, wherein MO_x is a metal oxide which is deficient in oxygen as compared with the stoichiometric composition, and M is at least one metal selected from the group consisting of Ti, Nb, Ta, Mo, W, Zr and Hf.

7. The process for producing a sputtering target according to Claim 6, wherein, as the undercoat, a layer having a thermal expansion coefficient intermediate between the thermal expansion coefficient of the ceramic layer and the thermal expansion coefficient of the substrate, and/or a layer having a thermal expansion coefficient close to the thermal expansion coefficient of the ceramic layer, is used.

8. The process for producing a sputtering target according to Claim 6, wherein the plasma spraying is water plasma spraying.

9. The process for producing a sputtering target according to Claim 6, wherein a cylindrical substrate is used as the substrate.

10. The process for producing a sputtering target according to Claim 6, wherein a surface-roughened substrate is used as the substrate.

11. A method for forming a film having a high refractive index by sputtering, wherein, as a sputtering target, the sputtering target as defined in any one of Claims 1 to 5 is used.